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ABSTRACT

As digital audio evolves, it is only natural that college radio stations reflect the same industry standards. Managers of college radio stations are facing the dilemma of making the decision of which digital audio system to acquire. A specific characteristic for those in the academic world is that whatever piece of equipment is chosen will be around for a long period of time. It is imperative that all possible uses be considered when choosing a system. Teachers of audio/radio production, ironically, are finding themselves returning to the world of analog concepts--the concepts of audio and radio production are best learned in the analog world. One university professor's experience (endorsed by professional studio producers) is that an understanding of digital concepts and theory is more important than learning a specific system. (A checklist and a list of software and hardware examples are attached.) (RS)

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Running head: DIGITAL AUDIO

PREPARING STUDENTS TO ENTER THE DIGITAL AGE:

COLLEGE RADIO AND DIGITAL AUDIO TECHNOLOGY

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PREPARING STUDENTS TO ENTER THE DIGITAL AGE: COLLEGE RADIO AND DIGITAL AUDIO TECHNOLOGY

Introduction

As digital audio evolves, it is only natural that college radio stations undertake the same industry standards. Therefore, the focus of this paper is to address: (1) the need for and utilization of digital audio in the college radio station; (2) the selection of digital audio systems; and (3) applications to foster the teaching of digital audio. Additionally, a checklist is provided to use when considering the acquisition of digital audio systems.

Digital Audio in the College Radio Station

As a manager of college radio station[1], it is inevitable today that one is facing the dilemma of making the decision of which digital audio system to acquire. This matter is no longer one of "are we going to do it," but rather, "we must do it to keep our students and station up-to-date with the industry technology."

> Although they are but a portion of station operations, digital production tools can help you shape the face of your station image, and productions. They can also take you to the next level of sound, quality, and

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[1] The term "college radio" encompasses stations operating on college and university campuses, including 2-year colleges.

> creativity in your media. (Barker, Pierce, and Albright, 1996, p. 18.)

From the outset, it is important to understand what the industry is talking about when we use the term "digital audio." The author proposes that two distinct, yet overlapping, areas are encompassed in digital audio at the radio station: programming and production. Concerning programming, the digital system houses the on-air product (music, spots, jingles and sounders, news and sports actualities, etc.) and thus replaces many of the analog devices (in particular cart machines, turntables, and cd players). The amount of product digitally stored depends on the memory capability of the computerized system being utilized. Of course, one must be aware that such digital programming will most likely play very heavily in the future within the aspects of Internet radio (see Beacham, 1997), cable radio, DAB (digital audio broadcasting), and DTH (direct-to-home satellite radio).

Concerning the use of digital audio in the actual broadcast/transmission application, it was written that the:

> [D]igital technology revolution has more to offer your station that just production and delivery. It can provide the basis for the cleanest, best sounding radio broadcast available anywhere. It impacts the how the radio signal is processed and generated, and how well

> your station is heard by your listeners. (Barker, 1996, p. 15.)

Barker's 1996 article cited above, entitled "Basic Anatomy of a Digital Broadcast," provides a good overview of digital technology and the broadcast chain. "Exploring the possibilities of going digital is a very worthwhile endeavor for an institution. Analog broadcast components were not built to last forever and wear out over time" (p. 18).

As for production, Skip Pizzi, wrote in the January/February 1997 of BE Radio (of which he is the editor) that "the traditional use of a series of discrete devices for record/playback, mixing and processing of audio is being replaced by a more monolithic single device -- the *digital audio workstation* (DAW)" (p.24). He continued that:

> It is fairly well-known that DAWs are available in three basic types, defined by the computer upon which they are based: the Apple Macintosh, the IBM PC or a non standard ("proprietary" or "dedicated") computer. Among the many variations between DAW systems, this is the most basic distinction. (p.26)

All concerned would probably agree that when considering digital systems for either programming and/or production, they would prefer those that have the following attributes: intuitive, powerful, ease of use, ease of configuration, virtually maintenance free, reliable, and a minimal learning curve. In reality, for many of us in the

academic environment, most equipment considerations are based on economics. So, if we can acquire systems that will run on already existing computer equipment at the school, we are half-way there. Of course, use of our LAN systems on campus (Local Area Networks) provide the tie between production and programming, if needed.

In regard to the acquisition of "proprietary" systems as mentioned above, it should be cautioned that such systems can prove hard to justify since they are stand alone units and thus do not provide for use with existing systems and cross utilization by others. But, proprietary systems are at times specifically warranted since they are totally dedicated to your use and mission. Additionally, proprietary systems do not require that the system "fit in" with existing hardware, which can limit or alter your intended functions.

Selecting a Digital Audio System

Once the decision has been made to move into or even upgrade an existing digital audio system, then the matter becomes one of selection. A specific characteristic for those of us in the academic world is that whatever piece of equipment we choose, we are most aware that it will be one that will be around for a long time. It is not unlikely to see pieces of analog equipment at the campus radio station that are close to 20 years old. Reality tells us that

whatever system we choose, it will define what we will be working with and teaching on for years to come.

The fact is that there are a lot of systems to choose from. "And, as with computers, what appears current today was probably outdated by a new development yesterday" (Sauls, 1996, p. 3). The author recommends that one educate themselves on not only specific systems, but digital technology overall. (Included here are references which can be utilized: An Introduction to Digital Audio by John Watkinson; Digital Audio & Compact Disc Technology (Third Edition) by Baert, Theunissen and Vergult; the USA Digital Radio home page @ http://www.usadr.com.; and the Radio and Production magazine @ http://www.rapmag.com.)

When choosing a system, it is imperative that all possible uses be considered. Since this system may be housed in an academic environment (one in which teaching also takes place), be sure to review the use of the digital audio system in conjunction with video and/or film sound applications. Thus, does your digital audio system need to have SMPTE time code ability? Will your system have 24 fps (frames per second) need? What peripheral equipment (analog and digital) will be used for loading and storing audio with the digital audio system and how will that equipment be connected to the system?

As for cost, don't cheat yourself! Short-changing your station and/or academic department can have a major

impact on your station and program development. Upfront costs may be high, particularly if you need to purchase a lot of hardware. But, going the more competitive, lower priced route may not be the best decision initially. You may have to work on justifying a more high-end system, but it will be worth the extra work.

A final thought concerning the selection of a digital audio system has do with the basics of investing in computers. In the same issue of BE Radio cited earlier, Kevin McNamara addresses common mistakes undertaken with acquiring PC-based technology. These can easily be adopted when considering a digital audio system. He wrote that:

> Profitable investment in computer equipment follows a different set of rules, and like many other industries, broadcasters are learning this the hard way. Consider the following "seven deadly sins" of computer asset management, and see if at least some don't seem painfully familiar. (p. 12)
>
> 1. Lack of a strategic plan.
> 2. Placing the engineering department in charge of all computer systems.
> 3. Investing in the wrong equipment and trading computer equipment.
> 4. Employees specifying equipment.
> 5. Lack of a software standard.
> 6. Improper training.

7. No security plan. (pp. 12; 14)

(For use in the selection of a digital audio system, a checklist is provided in Appendix A and examples of software and hardware are provided in Appendix B.)

The Teaching of Digital Audio

It is becoming more and more clear that as we move into the digital domain, we, as teachers of audio/radio production, ironically are finding ourselves returning to the world of analog concepts. Basically, we are finding that while students can use the computer, that doesn't make them production literate. The concepts of audio (sound) and radio production (mixing, layering, transitioning, etc.) are best learned -- for whatever reason -- in the analog world. Some of us believe it is because the student is sitting in front of an audio console and working with physical tape and equipment which provides for a more conducive atmosphere to production. (Thus, that is why many digital audio systems tout the ideal that you are still sitting in front of a mixer and, so, the newcomer to digital audio is already somewhat familiar with the atmosphere and not scared by the computer technology.)

Reality also shows us that not all radio stations are moving so quickly into the digital world. Let's face the fact that the last place a lot of station managers and owners want to put money is into equipment. So, we just can't completely turn to teaching just digital when the

student will probably be confronted with analog for some time to come in the commercial (real) world. But, as stations are moving to more to digital, we must also be teaching in that arena.

What do we teach concerning digital audio? The author's experience (and endorsed by professional studio producers) is that the understanding of digital concepts and theory is more important than learning a specific system. Here, the ideals of track and memory management are continually reinforced because of the domain in which digital audio operates. Theoretically, it is postulated here that if the student can learn the underlining concepts of digital audio that they can be applied across all systems. In short, if a student just learns "a system," then they will only be able to work on that specific model. But, if the student can understand the theories of digital audio, these can be applied to all systems.

Of course, the practical understanding of digital audio must be taught on a system. Additionally, the radio station will be operating on a given system.

Finally, the aspect of completing a project and walking away from it must be addressed. We are finding more and more that in the use of digital technology (including video and film applications) producers are finding it more difficult to find closure on productions because of the ability to continually "fine tune" various aspects. The ideal that

"correction to perfection" because of the power of the technology begins to reach the point of absurdity. The student as producer must find the point of self-contentment to realize conclusion on pieces. The concept of reworking over and over again to improve the work needs to be controlled to proper use. Otherwise, one is never finished nor satisfied with their work.

> The digital process allows you to work with sound more precisely, and grants you more creative freedom and efficiency in producing spots. It's important to remember however that it's not only the computer that directly makes your production better. It will always be the talent, not the tools, that get the job done. (Barker, Pierce, and Albright, 1996, p. 14.)

Learn how to best utilize these powerful tools in the station and the classroom.

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Appendix A

CHECKLIST

USE:

Programming and/or Production

ATTRIBUTES:

Intuitive, Powerful, Ease of Use, Ease of Configuration, Virtually Maintenance Free, Reliable, Minimal Learning Curve.

COST:

SYSTEM NEEDS & COMPATIBILITY:

Compatibility with existing computer equipment?

Campus LAN system compatibility?

Proprietary system?

Video and/or Film sound applications?

SMPTE time code needed?

24 fps (frames per second) need?

Peripheral Equipment (analog and digital) compatibility?

The *Orban DSE 7000 Workstation Worksheet* contained the following concerning selection:

Ease of Use: "Look & Feel"
Editing Ease
Training & Installation

Speed & Productivity:
Editing Speed
System Speed
Return on Investment

Appendix B

Software and Hardware Examples

Source: Barker, Pierce, and Albright, 1996

Macintosh platform:

Macromedia's sound package SoundEdit 16

DigiTrax 1.2 multitrack recording

Macromedia's Deck II 2.5

Digidesign's ProTools DAE Powermix

Digidesign's Audiomedia II and III

Digidesign's ProTools III and 4.0 systems

Windows/PC platform:

Innovative Quality Software's SAW and SAW Plus

Digital Audio Labs' FastEddie and EdDitorPlus

Source: National Association of College Broadcasters ListServ, October 19, 1996

Mulitrack Editing: Digidesign Session

Proprietary systems noted by the author:

Roland DM-80 and DM-800

Harris-Allied DSE 7000